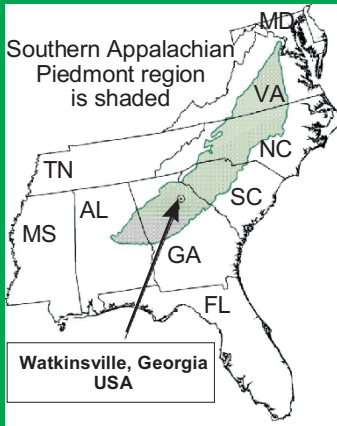




Agricultural Research Service



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Soil Resource Management
National Program

JPC Research Note - 07

Poultry Manure Management Trace Elements

Why does it matter?

Disposal of floor waste from chicken houses onto nearby agricultural land is a common practice, and can benefit farmers by supplying an organic form of fertilizer at a relatively low cost, but there is concern that trace elements may be accumulating in soil and possibly leading to toxicity levels in plants, animals, and food supplies.



Application of broiler litter



What was done?

Soil was sampled following 5 years of poultry litter application to 'Coastal' bermudagrass pastures compared with equivalent N supplied with inorganic fertilizer. 12 trace elements were determined in surface soil under pastures that were either (1) unharvested for conservation, (2) grazed by steers at low pressure, (3) grazed by steers at high pressure, and (4) hayed monthly.

What was found?

Soil accumulated higher levels of Cu, Mn, and Zn with poultry litter fertilization, but at levels not considered toxic. Grazed pastures accumulated greater concentration of trace elements than hayed fields, because feces from cattle returned elements to soil.

Trace elements supplied with poultry litter when applied to pastures at a rate of 5.4 Mg/ha/yr (dry wt), the equivalent of 3 ton/acre/yr (wet wt).

Element	kg/ha/yr
Manganese (Mn)	3.6
Copper (Cu)	2.4
Zinc (Zn)	2.3
Boron (B)	0.3
Lead (Pb)	0.1
Cadmium (Cd)	0.01

Trace element concentration (mg/kg) in surface soil (0-3-cm depth) at the end of 5 years of management.

Management	Mn	Cu	Zn
Inorganic (ave)	158	8	19
Poultry litter (ave)	304	26	40
Poultry litter			
Unharvested	308	21	37
Hayed	284	19	32
Grazed	312	33	44

A full description of this research can be found in the article:

Franzluebbbers AJ, Wilkinson SR,, Stuedemann JA. 2004. Bermudagrass management in the Southern Piedmont USA. IX. Trace elements in soil with broiler litter application. Journal of Environmental Quality 33: 778-784.

What's the impact?

Poultry litter is a significant source of trace elements. Risk of water contamination from runoff may be mitigated by interaction with surface soil organic matter accumulation.